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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/873,706	06/04/2001	Sridhar Gollamudi	3	4965

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EXAMINER	
PERILLA, JASON M	

ART UNIT	PAPER NUMBER
2638	

DATE MAILED: 10/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/873,706	GOLLAMUDI, SRIDHAR	
	Examiner	Art Unit	
	Jason M. Perilla	2638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 May 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-13 are pending in the instant application.

Drawings

2. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the replacement drawing sheets filed May 10, 2005 are not properly specified as "REPLACEMENT DRAWING SHEETS".

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Response to Arguments

3. In view of the Applicant's arguments filed August 5, 2005, the prosecution of the application is reopened.

4. Regarding the Applicant's argument against the prior art rejection of claims 1, 2, 5, and 6-13 under 35 U.S.C. §102(e) as being anticipated by Harrision (US 6154485), the Applicant suggests that the prior art reference Harrision does not disclose every claimed feature. Specifically, the Applicant contests that the prior art reference does not disclose a *correlation* coefficient. The Applicant notes "that a correlation coefficient is a numeric measure of the strength of a linear relationship between two random variables." (Appeal Brief, August 5, 2005; pg. 3, lines 7-8). Further, the Applicant provides an example of a correlation coefficient being a Pearson product-moment correlation coefficient. (Brief; pg. 3, lines 9-16). Further, the Applicant points to the specification, page 6, line 18 – page 12, line 14 for details regarding the correlation coefficient.

However, *none* of the specific limitations regarding a correlation coefficient which are pointed out by the Applicant are included in the claims. In fact, the specification (page 6, line 18 – page 12, line 14) does not provide for any of the specific description regarding a correlation coefficient which is provided in the Appeal Brief. Claim 1 provides for "determining at least one correlation coefficient between received signals from the at least two antennas". That is, as broadly as claimed, the correlation coefficient is limited only as being determined between received signals from the at least two antenna. The claim does not provide for a correlation coefficient which measures a linear relationship between variables or is determined according to a

Pearson product-moment correlation. Such limitations *are not contained in the claims* nor were they originally disclosed in the specification.

Finally, the Applicant purports that "[t]he adaptive array filter weights 90 and 92 described in Harrison are computed from the coefficient α which may be selected arbitrarily." (Brief; pg. 5, lines 15-17). However, the Examiner insists that the correlation coefficient of Harrison is chosen according to the received signals and *not* arbitrarily. As respectfully submitted in the final office action dated March 16, 2005, Harrison discloses in column 5, line 65 – column 6, line 6:

> "Thus, the process should be understood as a **continuous process** implemented in base transmitter 52, wherein traffic channel data is continuously received into the transmitter along with measurements and calculations needed **to compute adaptive array weights 90 and 92** (the correlation coefficient)..." (emphasis added)

Further, the Examiner hereby cites column 4, lines 28-38 of Harrison:

> "In order to support an adaptive array mode in base transmitter 52, subscriber unit 56 includes channel measurement and feedback processor 149. Channel measurement and feedback processor 149 **measures the characteristics of channels 108 and 110,** which together may be referred to as a composite channel between base transmitter 52 and subscriber unit 56, and then appropriately formats messages to send back to a base receiver. The **information contained in such messages are used to determine ... calculating the values of V_0 and V_1.** (the adaptive array weights; i.e. the correlation coefficient)" (emphasis added)

Thereby, Harrison plainly discloses that the channel measurement and feedback processor (fig. 1, ref. 149) in the receiver (fig. 1, ref. 56) returns channel information to the transmitter (fig. 1, ref. 52) which is used to update or compute the adaptive array weights or correlation coefficient.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-2 and 5-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrison (US 6154485 – cited in IDS).

Regarding claim 1, Harrison discloses a method of transmitting signals from at least two antennae (fig. 1; refs. 112, and 118) comprising the steps of: determining at least one coefficient (α; col. 7, lines 50-52) from received signals from the at least two antennae (fig. 1, refs. 116 and 118; col. 5, line 65-col. 6, line 6); and in response to the at least one determined coefficient selecting at least one of orthogonal coding and beamforming for transmitting signals using the at least two antennae (fig. 5; col. 8, lines 4-35). The adaptive beamforming coefficient α utilized in figure 5 is the equivalent to the adaptive array filter weights 90 and 92 which are utilized in the embodiment of figure 1. Harrison discloses determining the at least one coefficient from the at least two antenna but does not explicitly disclose that the coefficient is a correlation coefficient found between the received signals. However, Harrison discloses that the received signals from channels 108 and 110 between the transmitter and receiver of figure 1 are considered a composite channel (col. 4, lines 28-38) and that the composite channel is used to determine the coefficient. Therefore, as broadly as claimed, it is obvious to one having ordinary skill in the art that the coefficient is a correlation coefficient because a "correlation" is performed using the composite channel response between the at least

two received signals over channels 108 and 110 to determine the feedback which leads to the generation of the correlation coefficient.

Regarding claim 2, Harrison discloses the limitations of claim 1 as applied above. Further, Harrison discloses that the step of determining at least one correlation coefficient between the received signals comprises determining at least one amplitude correlation coefficient (fig. 5). The coefficient α of figure 5 determines the amplitude correlation of the various input signals for transmission (fig. 5, refs. 72 and 74) to the various antenna by the weight multipliers (fig. 5, refs. 172 and 176) by the function $(1-\alpha^2)^{1/2}$. Therefore, the correlation coefficient determines at least one amplitude correlation coefficient.

Regarding claim 5, Harrison discloses the limitations of claim 1 as applied above. Further, as broadly as claimed, Harrison discloses that the step of determining at least one correlation coefficient (fig. 1, ref. 149; col. 5, line 65-col. 6, line 6) comprises determining at least one correlation between received signals. The correlation coefficient α is utilized to determine the adaptive beamforming weights among transmission signals (fig. 5, refs. 72 and 74). Further, because traffic channel data is received and measurements and calculations are performed on the received signals and the channel data (col. 4, lines 28-38) to determine the correlation coefficient (col. 5, line 65-col. 6, line 6), Harrison discloses that the determination of the correlation coefficient is determined according to at least one correlation between received signals.

Regarding claim 6, Harrison discloses the limitations of claim 1 as applied above. Further, Harrison discloses that the step of selecting at least one of orthogonal coding

or beamforming comprises selecting a proportion of orthogonal coding relative to a proportion of beamforming of the transmitting signals (col. 8, lines 4-35).

Regarding claim 7, Harrison discloses the limitations of claim 6 as applied above. Further, Harrison discloses that the at least one correlation coefficient varies between a first level and a second level (col. 7, lines 59-61).

Regarding claim 8, Harrison discloses the limitations of claim 13 as applied above. Further, Harrison discloses that the at least one correlation coefficient having a level between the first and second levels results in selecting both beamforming and orthogonal coding for transmitting (col. 8, lines 22-35).

Regarding claim 9, Harrison discloses the limitations of claim 13 as applied above. Further, Harrison discloses that the at least one correlation coefficient determines the proportion of beamforming relative to orthogonal coding used for transmitting (col. 8, lines 4-35).

Regarding claim 10, Harrison discloses the limitations of claim 9 as applied above. Further, Harrison discloses that the at least one correlation coefficient being at a level that is closer to the first level results in transmitting more beamforming than orthogonal coding (col. 8, lines 4-35).

Regarding claim 11, Harrison discloses the limitations of claim 9 as applied above. Further, Harrison discloses that the at least one correlation coefficient being at a level that is closer to the second level results in transmitting using more orthogonal than beamforming (col. 8, lines 4-35).

Regarding claim 12, Harrison discloses the limitations of claim 9 as applied above. Further, Harrison discloses that the at least one correlation coefficient relative to the first and second reference levels determines the relative amounts of beamforming relative to orthogonal coding used for transmitting (col. 8, lines 4-35).

Regarding claim 13, Harrison discloses the limitations of claim 7 as applied above. Further, Harrison discloses that the at least one correlation coefficient being substantially equal to the first level results in selecting beamforming for transmitting and wherein the at least one correlation coefficient being substantially equal to the second level results in selection orthogonal coding for transmitting (col. 8, lines 4-35).

7. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrison in view of Forssen et al (US 6173014; hereafter "Forssen" – previously cited).

Regarding claim 3, Harrison discloses the limitations of claim 1 as applied above. Harrison discloses determining at least one correlation coefficient, but does not disclose that the step of determining at least one correlation coefficient comprises determining at least one phase correlation coefficient. The correlation coefficient of Harrison, α, is used to control the relative amount of beamforming to orthogonal coding used in the transmission (col. 8, lines 4-35). It is purely a real value having amplitude but not phase correspondence. However, one skilled in the art is familiar with adaptive beamforming and the use of phase adjustments applied to signals for the various antenna facets used in the transmission of a beamformed signal. Forssen teaches an adaptive beamforming system (fig. 4). Forssen also discloses that various phase shifts are made to the signals being applied to the various antenna facets to create a beam (col. 5, line 60-col. 6, line

17; *col. 6, lines 4-6*). Thereby, with the use of amplitude *and phase* information applied to the various signals transmitted to create a beam, the downlink carrier-to-interference ratio is improved. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to determine a phase correlation coefficient as taught by Forssen in the method of Harrison because the phase information can be advantageously utilized to create the adaptive beam which results in a lower carrier-to-interference ratio on the downlink.

Regarding claim 4, Harrison in view of Forssen disclose the limitations of claim 3 as applied above. Further, it is inherent that the at least one phase correlation coefficient α of figure 5 is estimated because it is generated from the channel feedback (fig. 1, ref. 149; col. 5, line 65-col. 6, line 6).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Perilla whose telephone number is (571) 272-3055. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Perilla
October 11, 2005

jmp

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER